

PATENT  
450117-03447

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION FOR LETTERS PATENT

TITLE: AUTOMATIC SELECTION OF A BACKGROUND  
IMAGE FOR A DISPLAY ON A MOBILE  
TELEPHONE

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105101-2887660

Sony International (Europe) GmbH  
 Sony Ref. PAE00-106DTCE  
 Our File: P23831EP

5      Automatic selection of a background image for a display on a mobile telephone

The present invention relates generally to the display of a background image on a display of a mobile telephone, and in particular to an automatic selection of a background image to be displayed.

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With the progress in miniaturisation of the mobile telephones, most of the space on the front surface is used up by the key pad and the display. The remaining space is commonly too small for a satisfactorily sized logo of a contract operator. Furthermore, a logo or advertisement printed on the surface of the mobile telephone might not be actual for the whole life cycle of the telephone.

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A presentation of graphical images on the display of a mobile telephone is a common feature for most of the mobile phones currently available. The graphical information is either stored in the memory of the mobile telephone or in the memory of the Subscriber Identity Module (SIM). The latter is described in EP 0 896 491 A1 according to which the instruction set of the SIM includes a graphical command for the display of graphical elements on the mobile phone's display unit.

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Furthermore, graphical representations in the form of icons are currently used on selected parts of the display, to inform the user of the status of this mobile equipment like for example the remaining battery capacity, ringing volume or an active alarm function. These icons have the advantage of conveying important information while occupying a minimum of space on the display but they are too small for a graphical feature with an advertising purpose. Increasing the size of these graphical elements on the other hand reduces the space available for the display of messages in an alphanumeric form.

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In EP 1 011 248 A2 a method and an apparatus for displaying background images in mobile telephones is described, according to which a background image is downloaded from a data source and stored in a memory. A user then can select a background from the memory for having it presented on the display unit of his mobile telephone. To avoid that messages displayed on top of the background image are thereby rendered unrecognisable, the display of the background image is stopped upon detection of an urgent character message display condition. The background image chosen for display

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is manually selected by the user and its selection does not depend on any parameters or a state of the mobile telephone.

- 5 The object of the present invention is now to propose a method and an apparatus for displaying a background image on the display unit of a mobile telephone in a simple and flexible manner.

- 10 This object is achieved by a method for providing a background image for a display of a mobile telephone, whereby the data of one or more of the background images are stored in at least one memory accessible for said mobile telephone, comprising the steps of automatically selecting a background image to be displayed from said one or more background images, retrieving the data of said automatically selected background image from said memory and displaying said retrieved background image on the display of said mobile telephone.

- 15 The above object is further achieved by a mobile telephone for a wireless telecommunication system, comprising control means for providing a background image on a display of the mobile terminal, whereby the data of one or more of the background images are stored in at least one memory accessible for said mobile telephone, the control means comprising selecting means for automatically selecting a background image to be displayed, a retrieving means for retrieving the data of the automatically selected background image from the memory, and a driver means for displaying the retrieved background image on the display.

- 25 The proposed method allows to display an image of advertising character even on miniature sized mobile telephones, particularly it allows a variable customising by the contract operator, who is the party to the telephone contract of the subscriber, on a space of sufficient size. Further advantageously, a background image will reflect the current operating state of a mobile telephone such as i.e. special services used or the network to which the mobile telephone is currently registered.

Further advantages features are claimed in the respective subclaims.

- 35 Advantageously, the automatic selection of the background image can be performed according to pre-set parameters, allowing the control of the image selection in a predetermined way. Further advantageously, the selection of the background image is based on information read from the subscriber identification file from which e.g. the contract operator can be identified. In a further advantageously embodiment of the

present invention the automatic selection of the background image is based on information received from a base station.

Advantageously, the background image is received from a base station upon the registering process. Alternatively, the background image data are advantageously read from a memory on the Subscriber Identity Module, from a memory of the mobile telephone unit or further advantageously, the background image data are read from an external memory connected to the mobile telephone.

Further, the background image data can advantageously be downloaded from a computer to the mobile telephone and/or from a source on the Internet by using the browser function of the mobile telephone.

For the display of a background image only, only those colours are used, which support the imagination of lying behind a foreground information displayed in one or more of the remaining colours with graphical displays with a colour depth of four grey scales, e. g. advantageously the colours white (transparent), light grey and dark grey are used for a background image, while the black colour is reserved for foreground information like e. g. messages in text or icon form.

A means according to the present invention can be implemented in the graphical user interface of the mobile telephone's controlling unit utilising the graphic capabilities of the displaying devices.

In the following description, the present invention is explained in more detail in relation to the enclosed drawings, in which

Fig. 1 shows schematically the functional blocks of a mobile telephone according to the present invention

Fig. 2 is a flow chart illustrating the basic procedure for displaying a background image,

Fig. 3 is a flow chart showing the basic steps of an advanced procedure for displaying a background image selected on the basis of the IMSI value,

Fig. 4 is a flow chart illustrating the procedure for selecting a background image according to the operator of the mobile network in which the telephone is currently registered,

Fig. 5 is a flow chart illustrating the procedure for a requested background image transmitted from the base station to the mobile telephone, and

- 5 Fig. 6 is a flow chart illustrating the procedure for displaying a background image with the selection decision being dependent from pre-set parameters.

In the drawings like elements are assigned like reference numeral.

- 10 In Fig. 1 a block diagram of a mobile telephone 100 according to the present invention is shown which comprises means for the transmission of data and sound signals 101 with user interfaces for the reception 102 and generation 102 of sounds and for information exchange with the user by not sound based methods 104, 105. Further the mobile telephone comprises a controller unit 106 controlling the overall operation of the
- 15 mobile equipment, a real time clock 107 for providing clock-pulses for the controller unit, a memory 108 containing a non-volatile section 109 for storing data which are not to be lost at conditions with no power applied to the electrical circuits of the telephone, and a Subscriber Identity Module (SIM) 110 with a memory section 111. A further data exchange interface 112 allows an exchange of data with other equipment like e.g. a
- 20 personal computer or a laptop. Additionally an external memory 113 such as a Memory Stick (Trademark of SONY Corporation) or the like can be attached to the mobile equipment which will then also be controlled by the controller unit. The means for processing data or sound signals for or from the wireless transmission essentially consists of an aerial 114 connected to an RF-transceiving unit 115, a baseband
- 25 processing unit 116, a channel coder/decoder 117 (codec), and a voice codec 118 with the microphone 102 and the speaker 103 of the telephone unit connected to it. Every of these single units is controlled by the controller unit. For information input from the user's side a jog dial 119 and a keypad 104 controlled by the controller unit are provided. A graphical user interface for presenting information of interest to the user is
- 30 formed by an LCD-display 105. It is to be understood that the different functional blocks of the diagram represent functional units of the mobile phone and should not be misunderstood as singular electronic devices. The memory 108 e.g. can consist of a variety of memories of different kinds distributed over the circuit board of the mobile telephone.

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Background images can be stored temporarily in the volatile section or permanently in the non-volatile section of a memory. Additionally or alternatively to storing a background image or a collection of background images in the memory of a mobile phone, it can as well be stored in a memory section 111 of the SIM 110 or will further

be supplied in an external memory which can be connected to the mobile telephone and which is e.g. adapted for an exchange of data between different electronic devices.

Fig. 2 shows the basic procedure for the selection and display of a background image on a display of a mobile telephone, whereby it is to be understood that only process steps relevant for the understanding of the present invention are shown in Fig. 2 and the following figures. After power-on S 201, the start up sequence S 202 ends in a check for the presence of the SIM module S 203, whereby a message S 204 asking the user to insert a SIM card is put on the display when the card can not be found. Is the SIM card found in place, a selecting means 120 background image and a retrieving means 121 reads S 206 the according data from a memory and finally the image according to this data is presented S 207 on the display of the mobile telephone by the driving means 123. The image can hereby be selected in various ways. Assuming that only one background image is stored in a memory, then the process of selecting the appropriate background image is reduced to selecting the only background image available. If a background image is to be chosen from a collection of several background images stored in a memory or distributed over several memories, then the selection is based on a set of parameter indicating the appropriate background image and the location in which the background image is stored. The parameters can be set in advance by the manufacturer of the phone or by the contract operator. Instead of storing the parameter set in the memory of the mobile phone, it can alternatively form a file in the memory on the SIM.

Fig. 3 shows an advanced procedure for providing a display of a background image, whereby the selection of this image is based on the contents of the IMSI file on the SIM card. After a user turned on the mobile phone S 201, a start up sequence S 202 initiates the elementary functions of the mobile phone and then checks the presence of the SIM card S 203. On a positive check result the International Mobile Subscriber Identification is read from the SIM followed by identifying S 302 the contract operator providing the SIM card from this file. Some of the background images collected in the memory of the mobile telephone are related to network operators and/or to companies selling mobile telephone contracts. With the identity of the contract operator known, a background image representing his identity is selected S 303 by the selecting means 120, read S 304 from the memory by the retrieving means and finally presented S 305 on the graphical display by the driver means 122. Alternatively the contract operator may store his background image in the memory of the SIM card. Further the background image or the selection of the background images can be stored in an external memory and read from there. If the background image related to the contract operator is not present in neither one of the described memories a substitute might be defined instead. According

- to the described procedure the selection process involves the assignment of an appropriate background image to the identity of the contract operator, checking for the location of the stored image, and if the image is not present in one of the accessible memories, assigning a substitute background image instead. Which background image
- 5 will be chosen as a substitute and if any, is defined according to the pre-set parameters which can be set by the manufacturer of the mobile equipment or be placed in the form of a file on the SIM card by the contract operator and/or can be entered or modified manually by the user of the mobile phone.
- 10 A process for showing a background image related to the operator of the currently used mobile network is illustrated in Fig. 4. The initial steps are identical to those of the procedures described above. After the presence of the SIM card has been checked S 203 positively the telephone registers S 401 on the next base station. On condition of a successful registering, the base station sends an identification S 402 of the operator
- 15 running the mobile network of which the base station is a part of. According to this identification a background image is selected S 403 from the collection of background images available to the mobile telephone by the selecting means 120, read from its location by the retrieving means 121 and presented S 405 on the display of the phone by the driving means 122. The selected background image 404 can either be related to the
- 20 identity of the network operator or be a substitute if no such image is available. Alternatively to taking an image from one of the memory locations which can be accessed by the mobile phone, the image may be transmitted from a base station in the process of the registering procedure. This is shown in Fig. 5 illustrating that in consequence of the registering process S 401 the base station at first sends the
- 25 identification S 402 of the network operator which initiates a request S 501 for a background image from the side of the mobile telephone triggered by the selecting means 120 which in turn will be satisfied by the transmission S 502 of the requested image by the base station. After reception S 502, the respective background image will either be stored in one of the described memories or send directly to the display for a
- 30 graphical presentation S 503 by the driving means. Alternatively, the selecting means 120 requests for sending a background image only if a background image relating to the identity of the network operator could not be found in the collection of images in one of the memories.
- 35 The procedure shown in Fig. 6 is a combination of the procedures described above. The decision criteria on the branch points are based on a predetermined set of parameters. This set can be determined by the manufacturer of the telephone either according to his own requirements or according to the requests of the contract operator. The parameter set is stored in a memory of the phone. Alternatively, the set of parameters can be

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- stored in a file on the SIM card. Further, a user might be allowed to access the parameter set for modifying it according to his own convenience. After power-on S 201, the normal start-up sequence S 202 or, depending on the content of the parameter set, a different start-up sequence S 602 displaying a pre-defined background image runs, setting up the necessary functions of the telephone until the point when the presence of the SIM card is checked S 203. After a successful check of the SIM card one of the modes for displaying a background image described above is selected S 603 according to the content of the parameter set by the selecting means. Additionally, a condition for the selection will be the availability of appropriate background images.
- 10 One of the selection possibilities is to display a background image related to the contract operator identified via the IMSI file located on the SIM card S 604. The according background image might be of an advertising character or just be a logo of the contract operator. The second selection possibility S 605 concerns the display of a certain background image or several background images in sequence as defined by the
- 15 predetermined parameter set as long as the telephone is in a standby or in an idle mode but may continue for the phone being in an active state. According to the third possibility a background image related to the operator of the currently used mobile network is displayed S 607, whereby a background image related to the contract operator can be displayed as long as the network operator is not yet identified S 606. It
- 20 will, based on the parameter set be decided, if after a positive identification of the network operator a background image is requested from the base station S 608 or a background image related to the network operator or a substitute therefore shall be taken from one of the memories accessible by the mobile telephone. In the case of receiving the image, the parameter set defines further if the image will be stored for
- 25 further use in one of the memories or send directly to the display of the phone.

- Background images can be transferred from the memory 108, 109 of the mobile phone and the memory 111 of the Subscriber Identity Module to the external memory 113 and vice a versa. This allows the exchange of background images between different
- 30 electronic devices like e.g. other mobile telephones, computers or scanning equipment. This way the collection of background images can be modified by the user of the telephone. He can e.g. scan-in images of his own choice, transfer the data to the external memory and transfer it from there to the memory of the mobile telephone. Also the exchange of background images between two different mobile telephones can
- 35 be managed via the external memory. Another possibility of modifying the collection of stored background images offers the data exchange interface of the mobile telephone, with the help of which images can be downloaded directly from a computer. Mobile phones offering a WAP (W@P) capability 123 allow the user to download background images from a website accessible via the Internet.



- To make sure that the display of a background image does not interfere with messages which are simultaneously shown on the display in alphanumeric form like text or icons, the background images do not use all colours or grey scales available on the display. Especially colours with a high saturation are used for foreground information, while picture elements with colours of lighter shade including white respectively transparent form the elements of a background image. Preferably, on a display offering four grey scales for the presentation of alphanumeric and graphical information only the lighter grey tones are used for the background images. Whereby, the darkest colour is used exclusively for the display of information in the form of icons or text and the remaining shades of grey are used to display the background image. This way, an optical distinction between the background and the foreground of the display is achieved.

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